Tanta University Faculty of Engineering Power Eng. and Elec. Machines depart. Third year	Generation and economy of electrical energy Sheet No. 1 2014-2015

1. A power station has the following daily load curve:

Time (h)	0~6	6~10	10~12	12~16	16~20	20~24
Load (KW)	40	50	60	55	70	30

Draw the load curve and find:

i. The maximum demand.

ii. The generated energy per day.

iii. Average load.

iv. Load factor and demand factor assuming that the connected load is 200 KW.

v. Draw the duration curve and calculate the load factor from this curve.

2. A substation is used to supply a load with the following daily load curve:

Time (h)	0	2	6	8	12	14	18	22	24
Load (KW)	30	35	35	20	30	60	70	40	30

Calculate:

i. The generated energy per day.

ii. Average load.

iii. Load factor

3. The annual peak load of 30 MW power station is 25 MW. The loads connected to the power station have the following maximum loads: 10, 8.5, 5, and 4.5 MW. If the annual load factor is 0.45, find

iv. Average load.

v. The annual supplied energy.

vi. The diversity factor

vii. The demand factor.

4. Three generators are used to supply a certain load with annual load duration curve represented by straight line from 30 MW to 4 MW. The capacities of these generators are 15, 15, and 5 MW. Determine:

viii. Load factor

ix. The capacity factor.

x. The maximum demand.

5. A feeder is used to supply three distribution transformers. The transformers supply a group of consumers with connected loads as shown in the following table.

Transformers	Connected load	Demand factor	Diversity factor of the group
No. 1	10 KW	0.65	1.5
No. 2	12 KW	0.6	3.5
No. 3	15 KW	0.7	1.5

If the diversity factor between the transformers is 1.3, find the maximum load on the factor.

6. A common load is to be shared by two power plants; a base plant with 30 MW installed capacity and peak plant with 20 MW installed capacity. The yearly outputs of the plants are 130×10^6 KWh and 9×10^6 KWh respectively. The peak plant works for 2800 hours per year and supplied a peak load of 15 MW. If the base plant has a peak of 25 MW, calculate the annual load factor, the use factor and the capacity factor of the two plants.

7. Four generators with ramp rate of 12, 9.75, 7.5 and 3.75 MW/min are operating in parallel. At a certain loading level, the hot reserves on these units are 20, 22.5, 27.5 and 12.5 MW respectively. Find the minimum time required to distribute a load increase of 70 MW among the four units and the change in loading level for each unit.